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(54) TRANSFER FILM, METHOD FOR FORMING THIN FILM OF PANEL FOR DISPLAY DEVICE THEREBY, AND DISPLAY DEVICE HAVING THIN FILM FORMED BY THE METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a transfer film capable of transferring a thin film such as a conductive film, a heat absorption film or the like to a panel for a display device, a method for forming the thin film of the panel for the display device by the transfer film and the display device having the thin film formed by this method.
SOLUTION: The transfer film 10 comprises a structure in which a conductive film layer 3a and an adhesive layer 4 sequentially laminated on a base film 1. The film 10 arranged on the panel (not shown) for the display device is heat press bonded, and the conductive film layer 3a is transferred onto the panel for the display device. The conductive film of high quality is formed by transferring, and the display device of high image quality is obtained.

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CLAIMS

[Claim(s)]

[Claim 1] The imprint film characterized by having the structure which carried out the laminating of an electric conduction membrane layer and the glue line one by one on the base film.

[Claim 2] The imprint film characterized by having the structure which carried out the laminating of a heat-absorbing film layer, an electric conduction membrane layer, and the glue line one by one on the base film.

[Claim 3] The thin film formation approach of the panel for indicating equipments characterized by to imprint an electric-conduction membrane layer or an electric-conduction membrane layer, and a heat-absorbing film layer on the panel for indicating equipments while arranging the imprint film which has the structure which carried out the laminating of a heat-absorbing film layer, an electric-conduction membrane layer, and the glue line one by one and heating and pressurizing this imprint

film on the imprint film which has the structure which carried out the laminating of an electric-conduction membrane layer and the glue line one by one on the base film on the panel for indicating equipments, or a base film.

[Claim 4] The display characterized by having the electric conduction film formed by imprint or the electric conduction film, and a heat-absorbing film from the imprint film which has the structure which carried out the laminating of a heat-absorbing film layer, an electric conduction membrane layer, and the glue line one by one on the imprint film which has the structure which carried out the laminating of an electric conduction membrane layer and the glue line one by one on the base film, or the base film.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates [about the display which has the thin film which formed by the thin film formation approach and this approach of the panel for displays by the imprint film and the imprint film] more to the display which has thin films, such as the electric-conduction film formed using the thin film formation approach and this approach of the panel for displays which forms the electric-conduction film etc. by imprint, from the imprint film for imprinting the electric-conduction film etc. in a detail at the panel for displays, and this imprint film.

[0002]

[Description of the Prior Art] In manufacture of the panel for color cathode-ray tubes, in order to raise the brightness of a color cathode-ray tube, on the fluorescent substance layer formed in said panel inside, vacuum deposition of aluminum is performed and the technique which forms the so-called metal back film is adopted widely. Moreover, an aperture grill (shadow mask) is heated by the collision of an electron beam, in order to prevent the color gap generated when a landing gap of the electron beam by the temperature drift arises, tapetum nigrum is formed on the inside of the metal back film, i.e., the vacuum-plating-of-aluminium film, and the technique which absorbs the thermal reflex from an aperture grill is also performed (for example, JP,11-242939,A). If this Prior art is explained with reference to the cross-section block diagram of the color cathode-ray tube of drawing 4 , like illustration, the fluorescent substance layer 52 is formed in the inside (electron gun 61 side) of the panel 51 of a color cathode-ray tube, and the metal back layer 53 formed with the vacuum deposition of aluminum is formed so that the inside of this fluorescent substance layer 52 may be covered. Furthermore, tapetum nigrum 54 is formed so that the inside of this metal back layer 53 may be covered. In addition, in drawing 4 , in order to make an understanding easy, it only

illustrates as a fluorescent substance layer 52, and detailed illustration is omitted, but after making fluorescent substance SUTORAIBU or the fluorescent substance dot expressing red, green, and blue of each color form in the position of the tapetum nigrum 54 of the inside of a panel 51 in fact, the front face of the fluorescent substance SUTORAIBU or a fluorescent substance dot is established in the interlayer of a smoothing **** sake. Said tapetum nigrum 54 absorbs the thermal radiation produced by heating the aperture grill 55 which approaches the metal back film 53 and is arranged by the collision of an electron beam MB, and since it acts so that **** and reflection from the inside of the metal back layer 53 to the aperture grill 55 may be suppressed, the coefficient of thermal expansion of the aperture grill 55 is mitigated.

[0003] The approach to which form the metal back film 53 by the vacuum plating of aluminium for every panel of the panel for color cathode-ray tubes first, and melt a graphite to an organic solvent, it carries out a spray coating cloth to this metal back film 53, and tapetum nigrum 54 is made to adhere as an approach of forming said tapetum nigrum 54 is learned. Moreover, after forming the metal back film 53 of aluminum, how to vapor-deposit aluminum again by the pressure (0.1 - 0.01Torr extent) higher than the time of vacuum evaporationo of this film, and form the tapetum nigrum 54 of an aluminum oxide is also learned.

[0004]

[Problem(s) to be Solved by the Invention] However, there were the following troubles in the manufacture approach of the panel for color cathode-ray tubes which forms the metal back film and tapetum nigrum by the above-mentioned approach. Although this spray coating cloth method is first taken since vapor pressure is low and the graphite is unsuitable for the film formation by vacuum evaporationo in the spray method of a graphite, it is difficult to obtain good graphite film (tapetum nigrum) which there is a fault that thickness unevenness is in the formed film, or the film tends to exfoliate, and covers this fault. Moreover, by this spray method, if the vacuum-plating-of-aluminium film (metal back film) has a crack, a graphite will permeate a fluorescent substance layer and will cause a sunspot and color nonuniformity. After forming the vacuum-plating-of-aluminium film, by the approach of vapor-depositing aluminum again and forming the tapetum nigrum (melanism film) of an aluminum oxide Since it is the vacuum evaporationo under a low vacuum while there is an advantage that the formation process of the metal back film of aluminum and the formation process of the tapetum nigrum of the aluminum oxide for heat absorption can be carried out only by changing a pressure in the same equipment, Since the shade of tapetum nigrum arises in a panel inside by the mutual intervention of the vacuum evaporationo matter molecule from the effect and two or more heating evaporation sources of a ****** gas in equipment, it becomes the factor which starts the brightness nonuniformity of a color cathode-ray tube. Image quality deteriorates by these.

[0005] Although there is the approach of furthermore forming the film of magnesium or

barium, when forming the film of these magnesium or barium, the membrane formation stabilized when the pressure in a panel and residue gas concentration were not managed enough is difficult.

[0006] Also in said which approach, a film formation activity is done for every panel for color cathode-ray tubes. For example, when forming the metal back film of aluminum, a panel is installed for every vacuum tub which has a panel base for color cathode-ray tubes, subsequently the exhaust air in a vacuum tub is performed, the aluminum arranged after exhaust air and in a vacuum tub is heated and evaporated, and the metal back film of aluminum is formed in a panel. A panel will be demounted from a vacuum tub after metal back film formation, and the activity of exhausting by newly installing another panel in a vacuum tub will be repeated. For this reason, an activity man day increases.

[0007] Therefore, this invention was made in view of such the actual condition, and aims at offering the high-definition display which has the thin film formed by the thin film formation approach and this approach of the panel for displays which forms the imprint film which can form a good thin film in panels for displays, such as a color cathode-ray tube, and the good thin film by this imprint film.

[0008]

[Means for Solving the Problem] This invention is an imprint film which has the structure which carried out the laminating of an electric conduction membrane layer and the glue line one by one, and enables it to form a good electric conduction membrane layer on a base film at the panel for displays.

[0009] This invention is an imprint film which has the structure which carried out the laminating of a heat-absorbing film layer, an electric conduction membrane layer, and the glue line one by one, and enables it to form a good heat-absorbing film layer and an electric conduction membrane layer on a base film at the panel for displays.

[0010] The imprint film which has the structure to which this invention carried out the laminating of an electric conduction membrane layer and the glue line to the panel for indicating equipments one by one on the base film Arranging the imprint film which has the structure which carried out the laminating of a heat-absorbing film layer, an electric conduction membrane layer, and the glue line one by one, and heating and pressurizing this imprint film on a base film, or an electric conduction membrane layer Or it is the thin film formation approach of the panel for displays which imprints an electric conduction membrane layer and a heat-absorbing film layer on the panel for displays, and enables it to form the good electric conduction film and a good heat-absorbing film.

[0011] This invention is a display which has the electric conduction film formed by imprint or the electric conduction film, and a heat-absorbing film, and it is made to raise the image quality of a display on a base film from the imprint film which has the structure which carried out the laminating of a heat-absorbing film layer, an electric conduction membrane layer, and the glue line one by one on the imprint film which has

the structure which carried out the laminating of an electric conduction membrane layer and the glue line one by one, or a base film.

[0012]

[Embodiment of the Invention] The operation gestalt of this invention is explained with reference to a drawing. some imprint films which drawing 1 shows 1 operation gestalt of this invention -- it is an expanded sectional view. The imprint film 10 concerning this invention has the structure where the laminating of the cushion layer 2, electric conduction membrane layer 3a, a glue line 4, and the covering film 5 was carried out to the base film 1 one by one.

[0013] A base film 1 consists of the film of the long picture constituted by PET (polyethylene terephthalate) etc., and the breadth dimension has the breadth dimension which is mostly equivalent to the height dimension at the time of seeing for example, a color cathode-ray tube from a transverse plane. Although not limited especially about the thickness of a base film 1, thickness which accident, such as cutting, does not generate to the tensile force of the film longitudinal direction in the imprint mentioned later is set up.

[0014] The laminating of the cushion layer 2 is carried out to a base film 1. This cushion layer 2 is formed in order to prevent making it exfoliate from electric conduction membrane layer 3a easily, without a base film 1 doing damage to electric conduction membrane layer 3a in the case of an imprint, and easing vibration of a pressure-welding roller etc. and doing damage to electric conduction membrane layer 3a. Therefore, the plane of composition of a base film 1 has a strong adhesive property, and with the plane of composition of electric conduction membrane layer 3a, it is formed so that an adhesive property may become weak. Although especially the thickness of the cushion layer 2 does not limit, it can be set as arbitration in consideration of extent of the impact of a pressure-welding roller etc.

[0015] The laminating of the electric conduction membrane layer 3a is carried out to the cushion layer 2. This electric conduction membrane layer 3a is imprinted by the fluorescent substance layer of the inside of a color cathode-ray tube etc., constitutes the metal back film, and is usually formed of vacuum evaporationo of aluminum. The laminating of the glue line 4 is carried out to electric conduction membrane layer 3a. A glue line 4 is pasted up inside a color cathode-ray tube panel by being heated and pressurized. The laminating of the covering film 5 is carried out to a glue line 4. This covering film 5 is formed in order to protect a glue line 4 and to make the handling of the imprint film 10 easy.

[0016] Although the imprint film 10 concerning above-mentioned this invention is formed by the predetermined means, since it is formed moving the long base film 1 continuously with in-line one, the vacuum evaporationo film of the aluminum which constitutes electric conduction membrane layer 3a does not have the damage on a crack etc., and it can make [which maintains a mirror plane condition] it good.

[0017] some imprint films which drawing 2 requires for other operation gestalten of this invention -- it is an expanded sectional view. Since the imprint film 20 concerning this invention is the same structure as the imprint film 10 of drawing 1 fundamentally, in order that it may avoid duplication of explanation except for the point which is the structure which made heat-absorbing film layer 3b the cushion layer 2 of the imprint film 10 shown in drawing 1 , and, subsequently to it, made the laminating of the electric-conduction membrane-layer 3a subsequently, it gives the same reference number to the same component as drawing 1 , and omits an operation and explanation of effectiveness.

[0018] The cushion layer 2 has an adhesive property as strong as the plane of composition of a base film 1, and with the plane of composition of heat-absorbing film layer 3b mentioned later, it is formed so that an adhesive property may become weak. For this reason, the field which counters heat-absorbing film layer 3b of the cushion layer 2 may exfoliate easily from heat-absorbing film layer 3b. When a color cathode-ray tube panel imprints with electric conduction membrane layer 3a, heat-absorbing film layer 3b gives the function which absorbs the heat from an aperture grille, and is usually formed as tapetum nigrum by the spray coating cloth of a graphite.

[0019] Although the imprint film 20 concerning this invention is formed by the predetermined means, since it is formed like the imprint film 10 of drawing 1 , moving the long base film 1 continuously with in-line one, the tapetum nigrum of the graphite which forms heat-absorbing film layer 3b can fix film pressure distribution, and it can make [which carries out mirror plane maintenance] good the vacuum evaporationo film of the aluminum which forms electric conduction membrane layer 3a.

[0020] Next, how to form a thin film in the panel for displays using the imprint film concerning this invention is explained. Drawing 3 is the typical cross-section block diagram of the equipment which forms a thin film in the color cathode-ray tube panel for explaining 1 operation gestalt of this invention. In drawing 3 , the imprint film 10 is installed in a roller 31, and it is rolled round by the roller 32 via rollers 33 and 34. Since the imprint film 10 is installed in the state of the roll format that the outside and the covering film 5 were wound so that a base film 1 might become inside at this time, when it is pulled out from a roller 31 and transported to a roller 32 side, a top and the covering film 5 come to turn [a base film 1] down. It counters near [33] the roller 33 (i.e., a roller), and the roller 35 and still more nearly another roller 36 are formed. The covering film 5 exfoliates from a glue line 4, and it is rolled round by the roller 36 in the place where the imprint film 10 pulled out from the roller 31 went via rollers 33 and 35. For this reason, the imprint film 10 in the condition that the glue line 4 was exposed is transported in the roller 34 and roller 32 direction. Tensile force works on the imprint film 20 between a roller 3 and a roller 4 by enlarging at this time, for example, rotation coefficient of friction of a roller 31, and enlarging rotation driving force of a roller 32.

[0021] Supporter material 38' and 39' are installed in the side (other side which

intersects perpendicularly with space in drawing 3) which left only the abbreviation breadth dimension of the imprint film 10 so that the imprint film 10 might be inserted into the pedestal 37 of a thin film deposition system in the direction of breadth from this supporter material 38 and 39 with the supporter material 38 and 39, respectively. the supporter material 38-38 -- 'between and the supporter material 39-39' -- in between, a cross section is supported by supporter material 38-38' and supporter material 39-39' by the typeface of **, and the rotatable plates 40 and 41 are attached.

[0022] the suitable upper supporter material of supporter material 38-38' and supporter material 39-39' -- a vertical migration list -- between the supporter material 38 (38') and 39 (39') -- width -- movable -- the pressure-welding roller 42 which consists of silicone material is attached so that it may be free. Moreover, between the supporter material 38 (38') of a pedestal 37, and 39 (39'), the transport device 43 which moves in the migration direction and the direction of a right angle (from for example, the space near side of drawing 3 to the direction of the other side) of the imprint film 10 is installed, and this transport device 43 lays the color cathode-ray tube panel 44 so that that inside 44a may become upward, and it moves directly under the imprint film 10. In addition, illustration is omitted although the fluorescent substance layer is already formed in inside 44a of this color cathode-ray tube panel 44.

[0023] When a transport device 43 moves directly under the imprint film 10, doubles the breadth location of the imprint film 10, and the breadth location of the color cathode-ray tube panel 14 and stops, Plates 40 and 41 rotate in the panel 44 direction for color cathode-ray tubes (dotted line of drawing 3). In connection with this, the imprint film 10 is drawn in the direction of inside 44a of the panel 44 for color cathode-ray tubes with plates 40 and 41 (dotted line of drawing 3), and the glue line 4 of the imprint film 10 comes to contact inside 44a of the panel 44 for color cathode-ray tubes. The pressure-welding roller 42 heated by predetermined temperature (for example, 100 degrees C) beforehand descends in this condition, and the pressure welding of the imprint film 10 is carried out, and it moves, pressurizing inside 44a by the predetermined pressure (for example, 1kg/cm2) to the periphery section (left-hand side of drawing 3) of another side from one periphery section (right-hand side of drawing 3) of the panel 44 for color cathode-ray tubes. Therefore, the imprint film 10 is pasted up on inside 44a of the panel 14 for color cathode-ray tubes by the thermocompression bonding of a glue line 4. If the pressure-welding roller 42 reaches the periphery section (left-hand side of drawing 3) of another side of the panel 44 for color cathode-ray tubes, it will go up, plates 40 and 41 will also rotate in the top direction, and a roller 42 will return to the first condition. In addition, heating to the imprint film 10 and sticking by pressure are uniformly attained by making suitable the configuration and diameter dimension of the pressure-welding roller 42 over the whole surface of inside 44a of the panel 44 for color cathode-ray tubes at this time.

[0024] On the imprint film 10, fixed tensile force is working between a roll 33 and 34,

and the cushion layer 2 of the imprint film 10 is pasted up on the base film 1, and with electric conduction membrane layer 3a, since an adhesive property may exfoliate weakly, with a rise of the pressure-welding roller 42 and the return of plates 40 and 41, the base film 1 and the cushion layer 2 of the imprint film 10 exfoliate from electric conduction membrane layer 3a, and return to the first condition. Thus, electric conduction membrane layer 3a remains in inside 44a of the color cathode-ray tube panel 44 by the glue line 4, that is, carrying out imprint grant of the electric conduction membrane layer 3a at the panel 14 for color cathode-ray tubes is performed from the imprint film 10.

[0025] The above can be performed by the approach with the same said of the case where a heat-absorbing film and the electric conduction film are formed in a color cathode-ray tube panel from the imprint film 20, although by carrying out imprint grant of the electric conduction membrane layer 3a from the imprint film 10 shown in drawing 1 described how to form the electric conduction film to the color cathode-ray tube panel 44. That is, instead of the imprint film 10 shown in the roller 41 of drawing 3 at drawing 1 , a base film 1 installs the imprint film 20 shown in drawing 2 , as an outside and the covering film 5 become inside, it winds the point around a roll 32 via rolls 33 and 34, and rolls round the covering film 5 with a roll 36. Imprint grant of heat-absorbing film layer 3b and the electric conduction membrane layer 3a is carried out at inside 44a of the color cathode-ray tube panel 44 by the approach of the heating same with having imprinted electric conduction membrane layer 3a from the imprint film 10 after this, and sticking by pressure.

[0026] Conveyance of the color cathode-ray tube panel 44 accompanying such an imprint, the imprint film 10 or winding of 20, actuation of the pressure-welding roller 42 or plates 40 and 41, etc. are performed as a series of actuation by the control unit and driving gear which are not illustrated according to a predetermined sequence.

[0027] Since the imprint film has the structure where the laminating of heat-absorbing film layer 3of cushion layer 2 and graphite b, electric conduction membrane layer 3a of aluminum, a glue line 4, and the covering film 5 was carried out one by one on the base film 1 according to the gestalt of this operation, electric conduction membrane layer 3a of aluminum maintains a mirror plane condition, and, as for the heat-absorbing film layer of a graphite, thickness distribution holds good membrane layers, such as regularity. For this reason, good these heat-absorbing film layer 3b and electric conduction membrane layer 3a can be imprinted now on the panel for cathode-ray tubes. Thickness distribution can mitigate a temperature drift by fixed heat-absorbing film layer 3b.

[0028] Since the cushion layer 2 by which the laminating was carried out is enabling exfoliation of a base film 1 by forming heat-absorbing film layer 3b or electric conduction membrane layer 3a, and a weak adhesion condition When a base film 1 deserts heat-absorbing film layer 3b or electric conduction membrane layer 3a with the

cushion layer 2 with the tensile force applied to a base film at the time of an imprint, Copy grant of these can be carried out at the color cathode-ray tube panel 44, without exfoliating simply from heat-absorbing film layer 3b or electric conduction membrane layer 3a, and doing damage on a crack etc. to these membrane layers.

[0029] In the approach of forming the electric conduction film of aluminum in the conventional panel for color cathode-ray tubes, since it set in the vacuum evaporation system about each panel for color cathode-ray tubes, exhaust air, heater heating, etc. were performed and aluminum was vapor-deposited, many man days were required. Since the imprint concerning this example is performed only by carrying out thermocompression bonding while the pressure-welding roller 12 runs from one periphery section of a panel 44 to the periphery section of another side, it can form heat-absorbing film 3b and electric conduction film 3a by the small man day.

[0030] In an imprint, since actuation of the arrangement to conveyance of a color cathode-ray tube panel, winding of an imprint film, and the panel inside of the imprint film by rotation of a plate, descent of a pressure-welding roller, pressure-welding migration, a rise, etc. is performed as a series of actuation according to a predetermined sequence, the efficiency can be increased, as a result an activity can raise the productivity of manufacture of a color cathode-ray tube.

[0031] In order that electric conduction film 3a of the aluminum formed in panel inside 44a may maintain a mirror plane condition, the defect of the panel for color cathode-ray tubes which has the thin film formed according to the operation gestalt of this invention who it becomes unnecessary to constitute an interlayer and accompanies an interlayer is lost. Since an interlayer formation process can be lost, the productivity of a color cathode-ray tube panel can be raised.

[0032] Since the heat-absorbing film (graphite film) formed of the imprint has good thickness distribution, it does not drop brightness further again. A temperature drift is also mitigated. Since the electric conduction film (metal back film) is maintaining the mirror plane condition, it can raise the brightness of a color cathode-ray tube. A high-definition color cathode-ray tube can be obtained by these.

[0033] Although the example applied to the panel for color cathode-ray tubes was described, this invention is not limited to this and can be applied also in PDP (plasma display panel) etc. That is, when forming an electrode layer (electric conduction film) in such a panel substrate for displays, an electrode layer (electric conduction film) can be formed by imprint.

[0034]

[Effect of the Invention] According to this invention, on a base film, since the imprint film has the structure where the laminating of an electric conduction membrane layer or an electric conduction membrane layer, and the heat-absorbing film layer was carried out one by one, it can form the good electric conduction film or the electric conduction film, and a heat-absorbing film.

[0035] Moreover, on a base film, since an electric conduction membrane layer and a heat-absorbing film layer are imprinted on the panel for color cathode-ray tubes by thermocompression bonding from the imprint film of the structure where the laminating of an electric conduction membrane layer or a heat-absorbing film layer, and the electric conduction membrane layer was carried out one by one, the good electric conduction film and a good heat-absorbing film can be formed.

[0036] Furthermore, since the panel for cathode-ray tubes which has the electric conduction film formed by imprint from the imprint film of this invention or a heat-absorbing film, and the electric conduction film has the good electric conduction film and a heat-absorbing film, it can obtain a high-definition display.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] some imprint films concerning the operation gestalt of this invention -- it is an expanded sectional view.

[Drawing 2] some imprint films concerning other operation gestalten of this invention -- it is an expanded sectional view.

[Drawing 3] It is the typical cross-section block diagram of the equipment which forms a thin film in the color cathode-ray tube panel for explaining the operation gestalt of this invention.

[Drawing 4] It is the outline cross-section block diagram of the conventional color cathode-ray tube.

[Description of Notations]

1 [-- A heat-absorbing film layer, 4 / -- A glue line, 5 / -- Covering film] -- A base film, 2 -- A cushion layer, 3a -- An electric conduction membrane layer, 3b